Message

From: Johnson, Steffan [johnson.steffan@epa.gov]
Sent: 5/6/2019 7:34:22 PM
To: Zimmerle,Dan [Dan.Zimmerle@colostate.edu]
CC: Marsh, Karen [Marsh.Karen@epa.gov]; Garwood, Gerri [Garwood.Gerri@epa.gov]; Dewees, Jason [Dewees.Jason@epa.gov]; Nash, Dave [Nash.Dave@epa.gov]; Fruh, Steve [Fruh.Steve@epa.gov]; rufael@chevron.com
Subject: RE: Data Needs for OGI operational envelope characterization

Dear Dr. Zimmerle,

Thank you very much for your reply below, these sorts of data sets are just what we need to help us better understand OGI in field practice.

As we discussed when you were here, of course OGI is an allowed alternative to M21 for upstream sources in OOOOa. The concern from our perspective is the set of conditions that bound the use of the camera during such a purposed event. Someone who uses the camera on a windy day and sees nothing may be quite surprised to see a number of leaks the next morning when the wind is calm (for example). This scenario is allowed by OOOOa, but if the first camera operator is someone at the plant and the second camera operator is someone from a regulatory agency, the outcome could be of great concern to the facility. Having an appropriate operating envelope that identifies proper operating procedure for a camera operator would help our first user (above) to know with some acceptable uncertainty that if they didn't see anything on the camera screen, there is a strong likelihood that there were no leaks there to be seen on a calmer day, or under some different condition.

Of course such an operating envelope has a similar purpose in refining and chemical sectors, but as I've laid out above, even though such data are not now required in upstream use, we see usefulness in collecting such data and working to define the set of conditions (aka "envelope") with which a user (or regulator) may have more confidence in the outcome of a given scan event.

We look forward to seeing this information, and we also look forward to continuing to better understand the OGI technology in partnership with METEC and Colorado State University.

With sincere regards,

Stef Johnson

From: Zimmerle,Dan <Dan.Zimmerle@colostate.edu>
Sent: Saturday, May 4, 2019 4:18 PM
To: Johnson, Steffan <johnson.steffan@epa.gov>
Cc: Marsh, Karen <Marsh.Karen@epa.gov>; Garwood, Gerri <Garwood.Gerri@epa.gov>; Dewees, Jason <Dewees.Jason@epa.gov>; Nash, Dave <Nash.Dave@epa.gov>; Fruh, Steve <Fruh.Steve@epa.gov>; rufael@chevron.com
Subject: RE: Data Needs for OGI operational envelope characterization

Stef, thank you for the complete list of info. We have been concentrating our work on upstream areas where – correct me if I'm wrong – OGI is already an approved alternative to M21. As you heard, there are likely a set of new technologies that may be equal to, if not superior to, OGI that we are trying to test. Regarding OGI, we've been working primarily on

characterizing OGI well enough that it could be compared with new solutions. There are limitations on what we've done, but the work should be informative.

Regarding your questions, below, here's the data we have from the study we just completed at METEC (Eben Thoma can comment additionally on the study):

Meteorology

- Ambient temperature → Yes, we tested February-November, so have some range
- Wind direction → Yes
- Wind speed → Yes, at 6m height
- Relative humidity → Yes, but in Colorado humidity range is relatively constrained
- Precipitation → Yes, some like precip and 1-2 days with snow on the ground. Not a full range of all conditions.
- Sky conditions → We had a wide range, but we do not necessarily have sky video for all of it.

Scanning Conditions and Practices

- Date/time → Yes
- Camera model → Yes; however all invited teams used some vintage of the GF320; We have an OpGal EyeCGas™ on site, but it was not used in study.
- Camera mode used during scanning → Yes, with some data gaps.
- Thermal background T → By this, I think you mean apparent temperature. We did not capture this, because it requires special handling of the camera to capture raw files, which we did not include in the protocol.
- Direction from component being viewed → Some, we have estimates of direction, but not 100% full data
- Distance from component being viewed → Yes, as reported by operator
- Dwell time scanning each component → Estimate by reporter. We also have time logs, so know roughly how fast an operator progressed *in aggregate*.
- Level of Operator training → Yes

We're preparing the analysis now, and would be happy to update the EPA team when we get further. Eben Thoma and, Parikshit Deshmukh (Jacobs), are our primary contacts for the study.

Dan.

Daniel Zimmerle – 970 581 9945 – dan.zimmerle@colostate.edu
Assistant: Debbie Isen Debbie.Isen@colostate.edu
Senior Research Associate | Energy Institute | Colorado State University
430 N. College Avenue | Fort Collins CO 80524
METEC: https://energy.colostate.edu/metec
http://www.energyinstitute.colostate.edu/p/dan-zimmerle

From: Johnson, Steffan <johnson.steffan@epa.gov>
Sent: Wednesday, April 24, 2019 7:53 AM
To: Zimmerle,Dan <Dan.Zimmerle@colostate.edu>
Cc: Marsh, Karen <Marsh.Karen@epa.gov>; Garwood, Gerri <Garwood.Gerri@epa.gov>; Dewees, Jason <Dewees.Jason@epa.gov>; Nash, Dave <Nash.Dave@epa.gov>; Fruh, Steve <Fruh.Steve@epa.gov>; rufael@chevron.com
Subject: Data Needs for OGI operational envelope characterization

Dear Dan,

It was a pleasure to meet with you yesterday here in RTP. Like you, the Measurement Technology Group sees a good deal of potential with respect to Optical Gas Imaging technologies, and yet we recognize that there remains much work to be done regarding the development of a workable LDAR protocol with OGI as the sole technology making the LDAR determinations.

To that end, I mentioned the need to collect 'metadata' that coincides with OGI scanning efforts, on a component by component basis, to help inform the bounds of such an envelope of operational parameters.

Specifically, the data we are looking for are:

Meteorology

- Ambient temperature
- Wind direction
- Wind speed
- Relative humidity
- Precipitation
- Sky conditions

Scanning Conditions and Practices

- Date/time
- Camera model
- Camera mode used during scanning
- Thermal background T
- Direction from component being viewed
- Distance from component being viewed
- Dwell time scanning each component
- Level of Operator training

While this list is extensive, collection of such data will hopefully provide for an appropriate definition of acceptable camera operation "window" where results can be expected to be more or less repeatable and predictable.

Please let us know if you have any questions, we are happy to engage in further discussion.

Very sincerely,

Stef Johnson

Steffan Johnson | OAQPS Measurement Technology Group Leader | US EPA Office of Air and Radiation | 109 TW Alexander Drive | Mail Drop E-143-02 | RTP, NC 27711| Desk: 919-541-4790 | Cell: 919-698-5096 | johnson.steffan@epa.gov